

Prospects for Deep Interior Helioseismic Holography

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Holographic seismic imaging of low-degree acoustic noise opens new diagnostic prospects that are most encouraging. (1) Low-degree seismic holography is already giving us images of large magnetic regions on the far surface of the Sun, a utility with valuable space-weather forecasting and general synoptic applications. (2) Diffraction-limited imaging of low-degree noise over pupils covering most of the near solar hemisphere promises the most discriminating probe of the deep solar interior, such as the base of the convection zone. (3) Earth-based seismic observations coordinated with seismic observations of the far side of the Sun at frequencies in the range 6–7 mHz would allow us to resolve the thermal and Doppler profile of the solar core with a resolution of 75 Mm. (4) The interaction of surface magnetic regions with seismic waves has a strong dependence on spherical harmonic degree. This remarkable property is highly suggestive of the basic mechanisms whereby magnetic regions absorb acoustic waves.

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